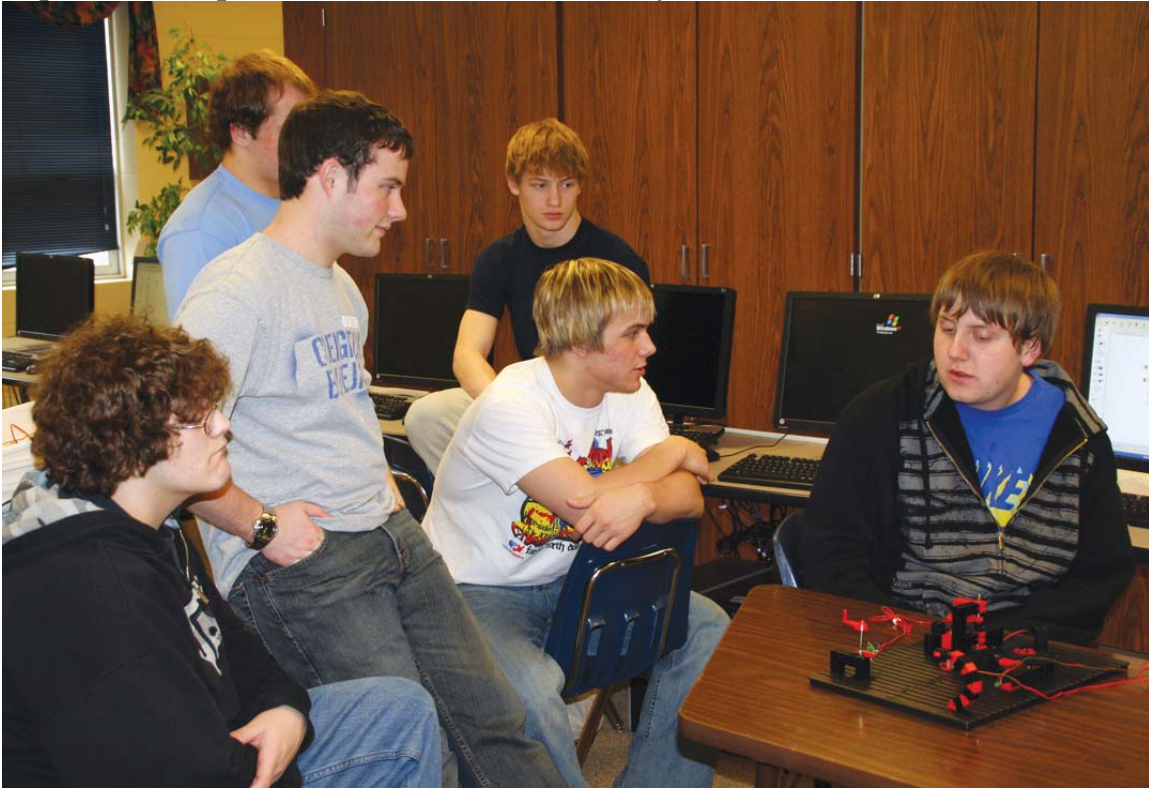


## **Hands on class offers dynamic learning experience**

**By Kari Elrod**

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A student not wanting to leave the classroom is something new for Canton High School teachers Ruel Eneboe and Jim Martinson. Both teach classes in the Project Lead the Way (PLTW) curriculum, a non-profit program encouraging more high school students to explore the engineering field. The classes complement math and science courses students have already taken.

PLTW prepares students for the demanding two and four year secondary education in engineering programs. It was created in 1986 in New York to help bridge the gap in the shortage for engineers nationwide. The program is now in all 50 states and 3,000 schools. This year, Canton High School became the first South Dakota school to offer the program. Canton implemented the program into its curriculum and students love the classes. Eneboe and Martinson are in awe of the many students that do not want to leave the classroom.

“Some days the toughest part of teaching is getting the students out. They just want to stay and finish the project. It’s amazing,” Martinson said. “It is so gratifying to have to kick kids out because they want to keep working.”

In an enhanced learning environment, students are given hands on experience in the engineering field. They are taught about the engineering field, how they can be employable, as well as the jobs and projects they would complete on a daily basis.

Students get so involved in the work they are doing, they hardly realize that it is homework. A challenging curriculum filled with problem solving easily fills the allotted time for class. Students use the Inventor program to draw their projects. This program is the same program that many professional engineers use on a daily basis.

“Project Lead the Way is an educational program that is designed to utilize what is called the STEM Model (which is the science, technology, engineering, and math model) as a way to encourage students to become interested and motivated in engineering, primarily in math and science areas,” Dick Hall, PLTW Coordinator, said on South Dakota Public Broadcasting’s production “High School 2025. Live. Grow. Build.”

The curriculum focuses on teamwork, which is a major part of the engineering career as real life engineers will work in groups. The stress of teamwork in the classroom is a key element to learning with the projects.

In Inventor, which is a computer aided design program, students draw and create 3-dimensional projects on the computer.

There are two classes offered through Project Lead the Way. Introduction to Engineering/Design is designed for freshman and sophomores. This class had 22 students the first semester, but lost some students at semester due to other conflicting classes. The class covers the basics of engineering and also delves into the things an engineering team would do in their careers. The upper level class is called Principles of Engineering. Currently, ten students are enrolled in the class. This is a second year class and incorporates more math and science into the curriculum.

“This is as real as it can get and still be in school,” Martinson said. “It makes it easy for the students to see why they are learning. It gives them a better reason to want to learn.”

The next project for the beginner class will be a reverse engineering project. Students will bring in an object, take it apart, and then find a way to improve the object without increasing the cost. This project will be done without much instruction.

“It’s fun to be on the computer drawing stuff,” Kylie Gaughenbough said. “The train project was fun. We had to draw all these things and put it together on the computer.”

Even the teachers learn something almost every day. Martinson joked that even with his two week intense boot camp training on PLTW, his students still know more about the program than he does. The program goes in depth enough that some things a person can only learn by navigating the program and spending hours with the software.

“You do the studying and then you see the benefits. It is awesome,” Senior Kevin Fluit said. “It’s different than anything we have done in school and we are learning different concepts with hands on learning.”

Fluit would like to go on to college at South Dakota State University to become a mechanical engineer.

Senior Chris Timm is also planning on becoming an engineer. He plans to focus on civil engineering and attend the School of Mines. He is glad he was given the opportunity to take this class because he has always wanted to be an engineer, but the class has given him the opportunity to realize that he will enjoy being an engineer.

“Using both math and science to build things is fun,” Timm said. “This gives us a feel for the projects so we can see what we want to go into. It gives us the insight to see if this is what you want to do. It is a fun class and I look forward to it everyday.”

In the upper level class, students are assigned a 25 page paper in the beginning portion of the class. Each student had to pick a particular area of engineering for the paper. They had to include a job description, prospects, employees, what engineers do, an interview with an actual engineer, and research eight semester colleges and complete a breakdown of the courses they would have to take. Then, the remainder of the class focuses on hands on projects and learning.

“Many of these skills are going to apply directly to their college curriculum,” Eneboe said. “The curriculum is project driven. The students will complete projects similar to what they will see if they go on to an engineering college.”

With projects to aid with learning, each project they are assigned has less guidance than the previous. Currently, students are just finishing a project where they received some guidance and they are moving on to a project where they will not have any guidance. They will be told what they have to do, but they each have to figure out how they will get the finished product.

Both classes of PLTW are excited because they received a grant (a renewal of the original grant) that they have used to order a dimensions printer. Last year the grant covered the computer lab for PLTW classes. The printer itself costs approximately \$20,000 and it is all covered under the grant. The printer will print their projects on this plastic with many layers to transform the plastic into a 3-dimensional object. They are hoping that the printer will arrive at the school within a month. Once the teachers are trained on the piece of equipment, the students will be allowed to print off their projects creating a precise 3-dimensional version of their computer drawings.

“This program offers a nice range of courses for students and I am happy with the program,” High School Principal Cory Strasser said. “When you start to look at real world applicability, the skills they learn in the classes will really pay off. They have had the math and science and now they can put it together.”

Currently, Canton High School is a pilot school for the PLTW program. Once the school becomes an official school for PLTW, students will be able to gain college credit for the courses they take. Strasser is hoping that the school will be official by the end of the year. Fluit recommends that any high school student with an imagination or creative side should take the class. He said, “It gives you a true insight. This class opens your doorways.”

#### Cutline:

Students use Robo Pro software to move motors, switches, and other Fisher Technique pieces on the class work they do for the Project Lead the Way curriculum. The class projects help students relate math and science skills to real life engineering projects.